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RIP version 1

Routing Protocols and Concepts – Chapter 5

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5.0.1 Introduction *

	Interior Gateway Protocols				Exterior Gateway Protocols
	Distance Vector Routing Protocols		Link State Routing Protocols		Path Vector
Classful	RIP	IGRP			EGP
Classless	RIPv2	EIGRP	OSPFv2	IS-IS	BGPv4
IPv6	RIPng	EIGRP for IPv6	OSPFv3	IS-IS for IPv6	BGPv4 for IPv6

In this chapter, you will learn to:

- Describe the functions, characteristics, and operation of the RIPv1 protocol.
- Configure a device for using RIPv1.
- Verify proper RIPv1 operation.
- Describe how RIPv1 performs automatic summarization.
- Configure, verify, and troubleshoot default routes propagated in a routed network implementing RIPv1.
- Use recommended techniques to solve problems related to RIPv1.

5.1.2 RIPv1 Characteristics and Message Format

RIP Characteristics

- -A classful, Distance Vector (DV) routing protocol
- -Metric = hop count
- -Routes with a hop count > 15 are unreachable
- -Updates are broadcast every 30 seconds

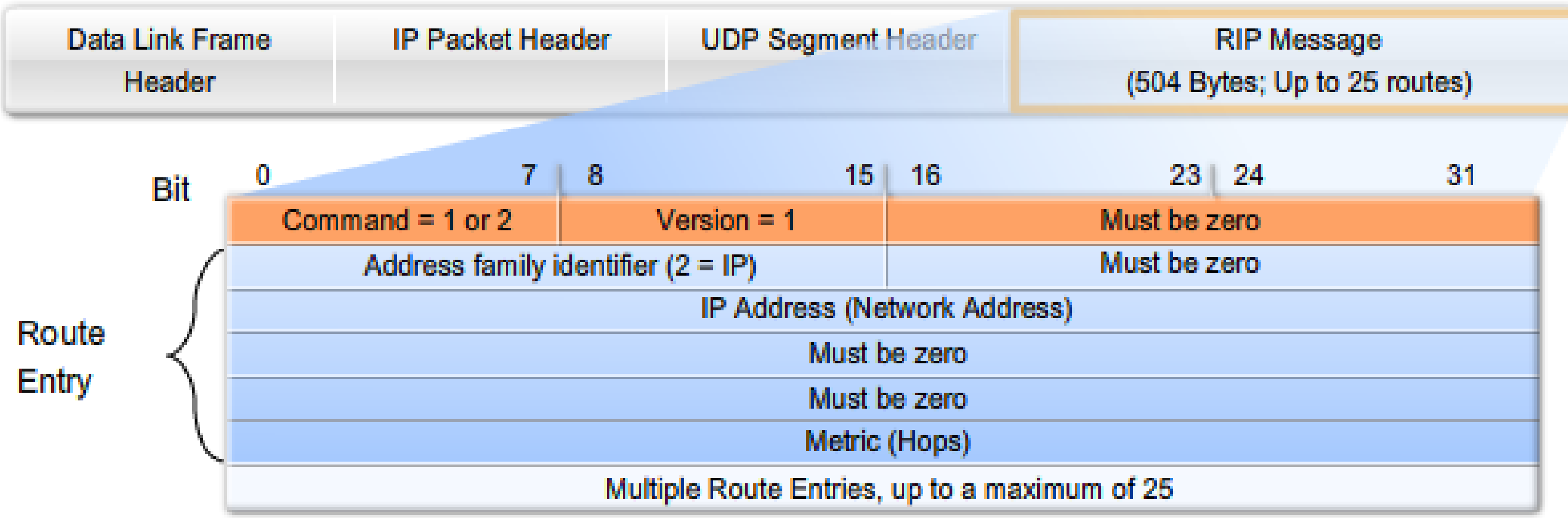
The encapsulated RIPv1 Message format contains the following fields:

- Data Link Frame Header
- IP Packet Header
- UDP Segment Header
- RIP Message containing 504 bytes with up to 25 routes

Rollover this graphic in your curriculum for more details…….

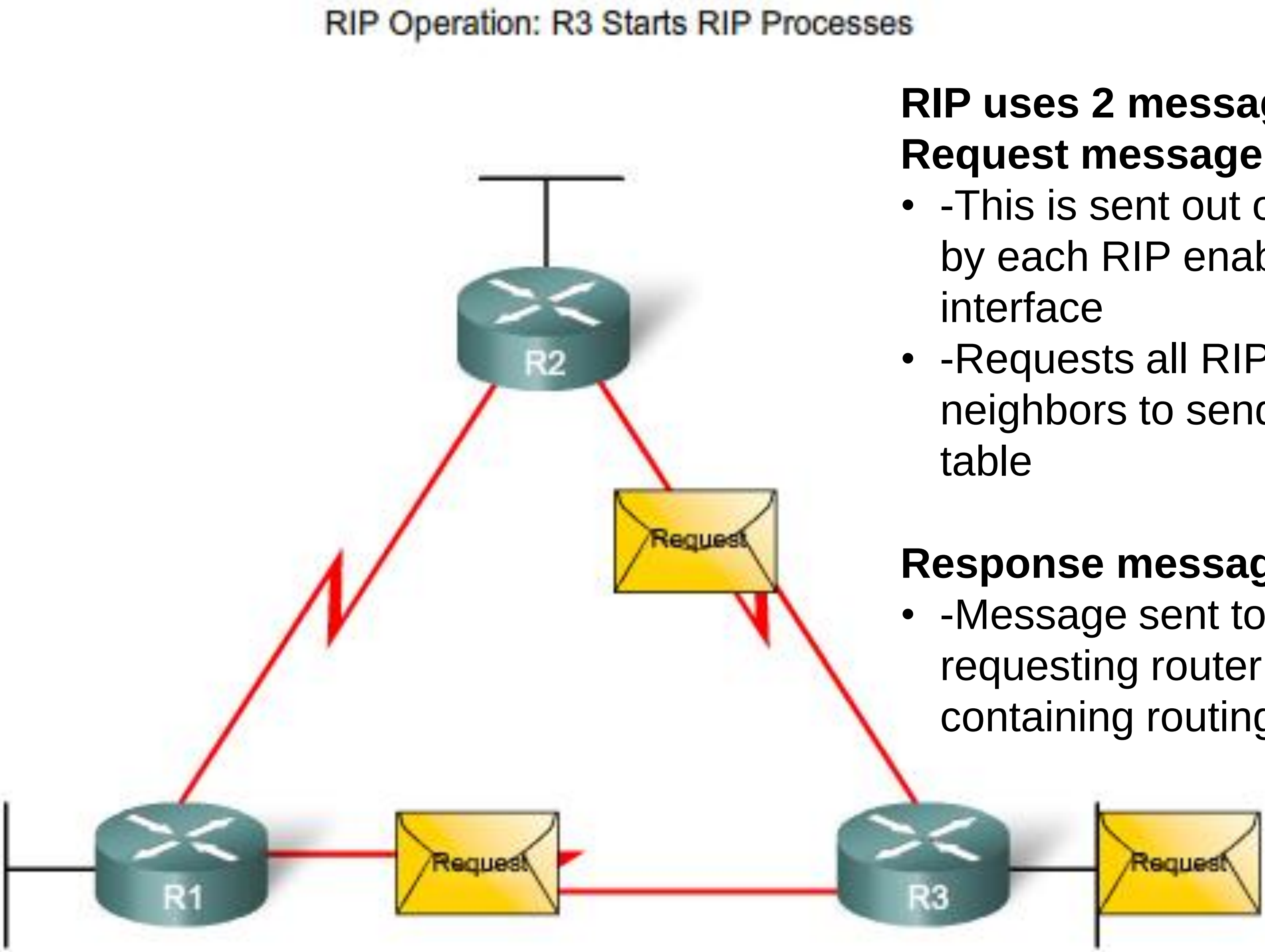
5.1.2 RIPv1 Characteristics and Message Format *

RIPv1 Message Format



Command	1 for a Request or 2 for a Reply.
Version	1 for RIP v 1 or 2 for RIP v 2.
Address Family Identifier	2 for IP unless a Request is for the full routing table in which case, set to 0.
IP Address	The address of the destination route, which may be a network, subnet, or host address.
Metric	Hop count between 1 and 16. Sending router increases the metric before sending out message.

5.1.3 RIP Operation



RIP uses 2 message types:

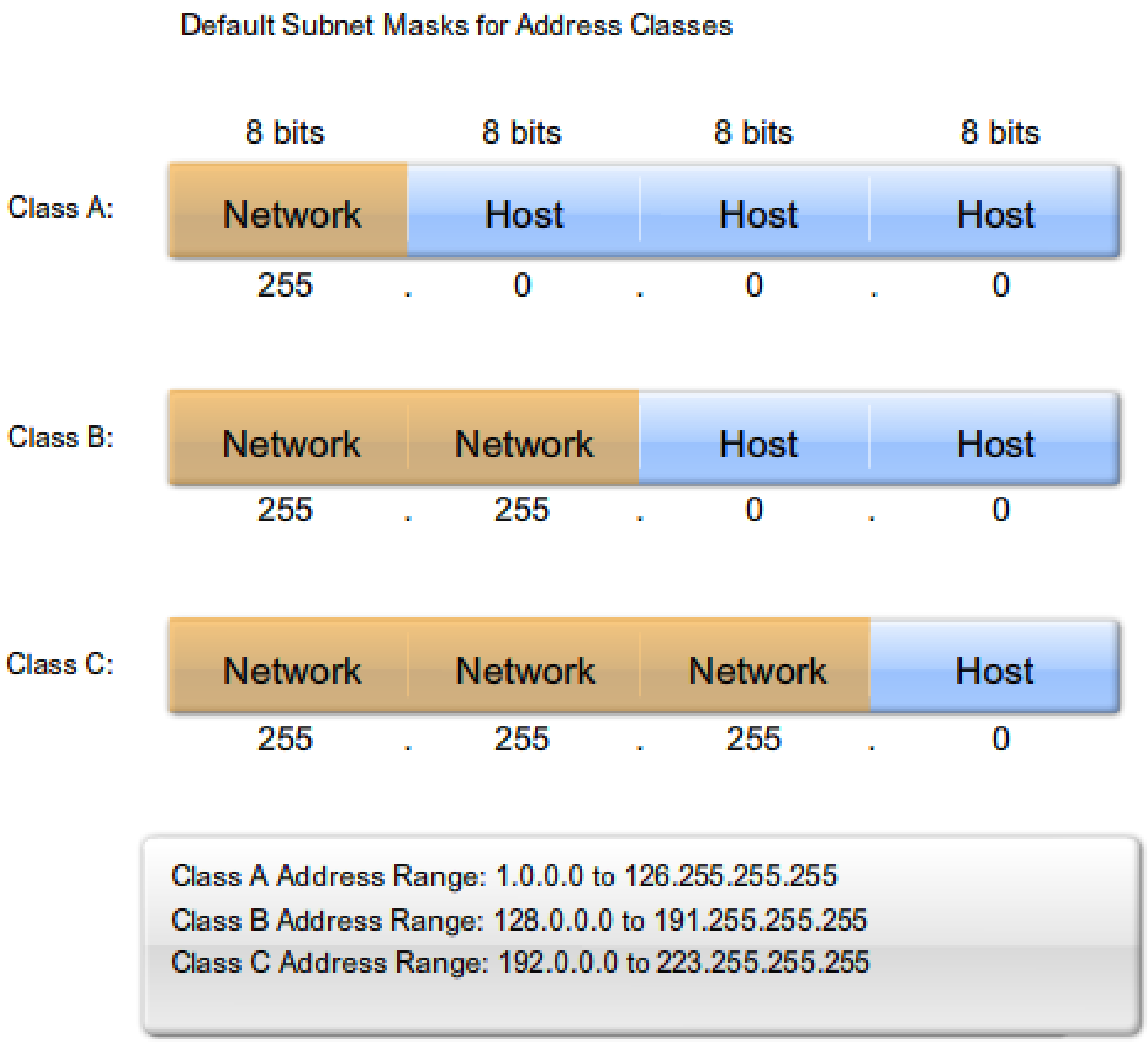
Request message

- -This is sent out on startup by each RIP enabled interface
- -Requests all RIP enabled neighbors to send routing table

Response message

- -Message sent to requesting router containing routing table

5.1.3 RIP Operation



IP addresses initially divided into classes
- Class A
- Class B
- Class C

RIP is a classful routing protocol
- Does not send subnet masks in routing updates

5.1.4 Administrative Distance *

```
R3#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF in
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA externa
       E1 - OSPF external type 1, E2 - OSPF external type 2,
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia
       * - candidate default, U - per-user static route, o -
       P - periodic downloaded static route

Gateway of last resort is not set

R    192.168.1.0/24 [120/1] via 192.168.6.2, 00:00:05, Serial0/0/0
R    192.168.2.0/24 [120/1] via 192.168.6.2, 00:00:05, Serial0/0/0
                    [120/1] via 192.168.4.2, 00:00:05, Serial0/0/1
R    192.168.3.0/24 [120/1] via 192.168.4.2, 00:00:05, Serial0/0/1
C    192.168.4.0/24 is directly connected, Serial0/0/1
C    192.168.5.0/24 is directly connected, FastEthernet0/0
C    192.168.6.0/24 is directly connected, Serial0/0/0
```

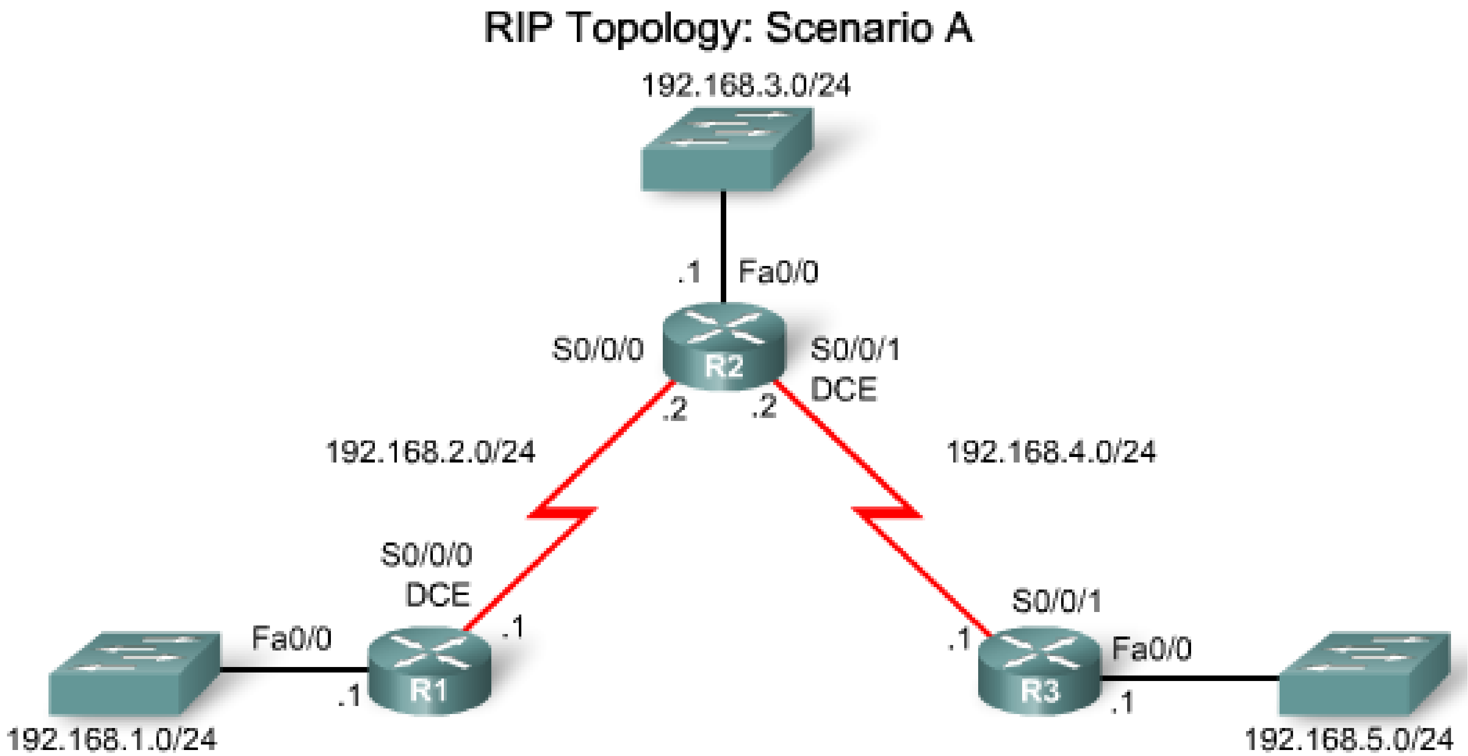
(AD) is the trustworthiness (or preference) of the route source

R3#show ip protocols

```
sion
main
Automatic network summarization is in effect
Routing for Networks:
  192.168.4.0
  192.168.5.0
  192.168.6.0
Routing Information Sources:
  Gateway         Distance      Last Update
  192.168.6.2          120      00:00:10
  192.168.4.2          120      00:00:18
Distance: (default is 120)
```

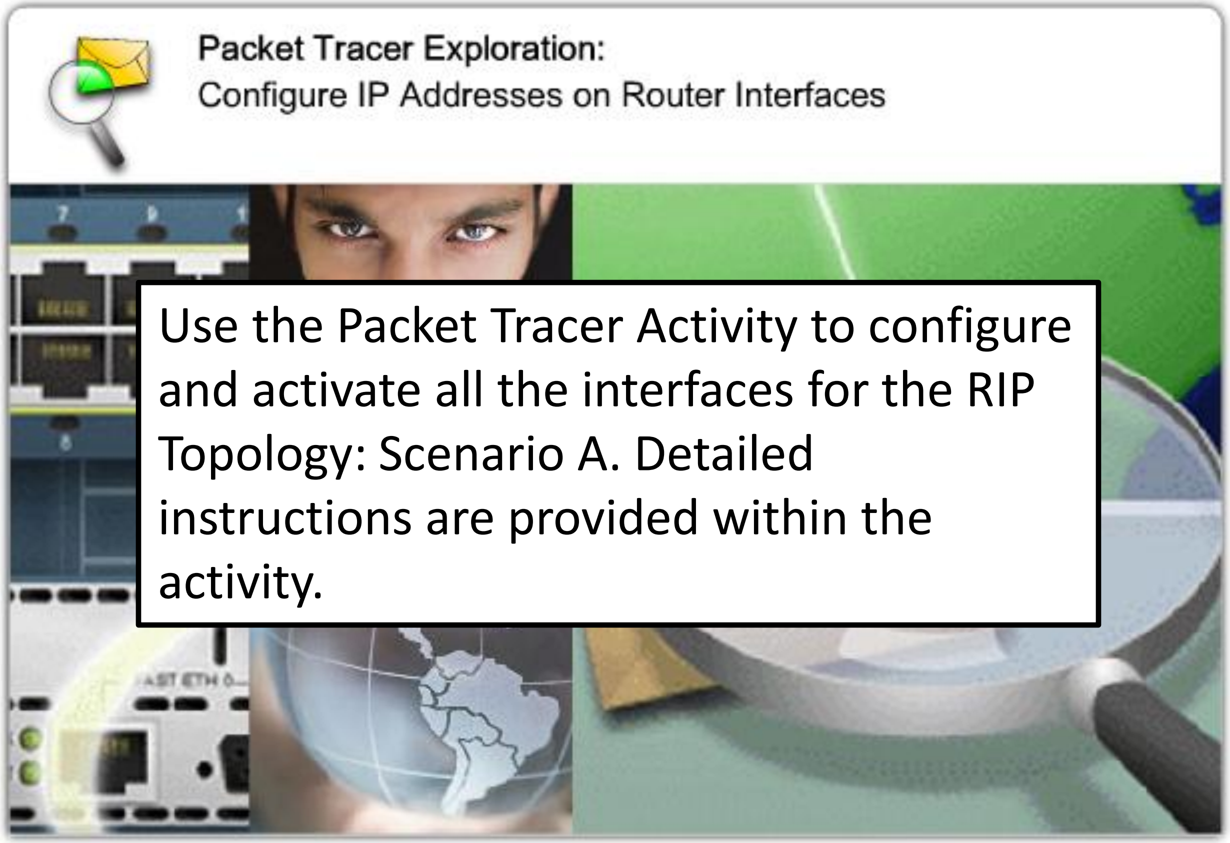
RIP's default administrative distance is 120

5.2.1 Basic RIPv1 Configuration



Device	Interface	IP Address	Subnet Mask
R1	Fa0/0	192.168.1.1	255.255.255.0
	S0/0/0	192.168.2.1	255.255.255.0
R2	Fa0/0	192.168.3.1	255.255.255.0
	S0/0/0	192.168.2.2	255.255.255.0
	S0/0/1	192.168.4.2	255.255.255.0
R3	Fa0/0	192.168.5.1	255.255.255.0
	S0/0/1	192.168.4.1	255.255.255.0

5.2.1 Basic RIPv1 Configuration

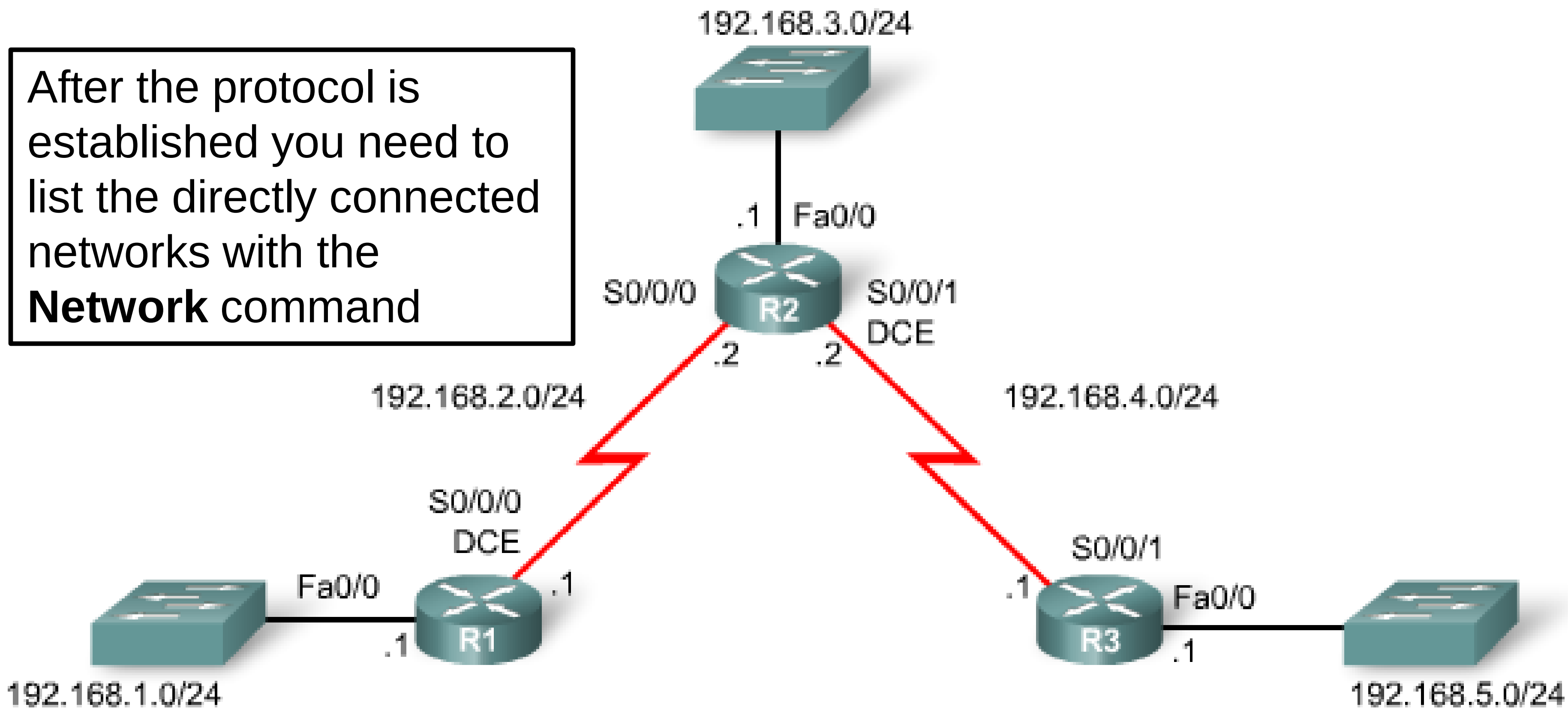


5.2.2 Enabling RIP (Router RIP Command)

```
R1#conf t
Enter configuration commands, one per line. End with CTRL/Z.
R1(config)#router ?
  bgp         Border Gateway Protocol (BGP)
  egp         Exterior Gateway Protocol (EGP)
  eigrp       Enhanced Interior Gateway Protocol (EIRGP)
  igrp        Interior Gateway Routing Protocol (IGRP)
  isis        ISO IS-IS
  iso-igrp    IGRP for OSI networks
  mobile      Mobile routes
  odr         On Demand stub Routes
  ospf        Open Shortest Path First (OSPF)
  rip         Routing Information Protocol (RIP)

R1(config)#router rip
R1(config-router)#
```

5.2.3 Specifying Networks

After the protocol is established you need to list the directly connected networks with the **Network** command



R3(config)#router rip
R3(config-router)#network 192.168.4.0
R3(config-router)#network 192.168.5.1

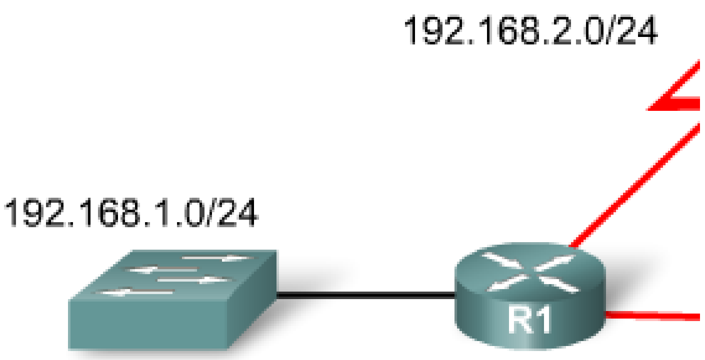
The IOS will correct this error

5.2.3 Specifying Networks

```
R1(config)#router rip
R1(config-router)#network 192.168.1.0
R1(config-router)#network 192.168.2.0
```

```
R2(config)#router rip
R2(config-router)#network 192.168.2.0
R2(config-router)#network 192.168.3.0
R2(config-router)#network 192.168.4.0
```

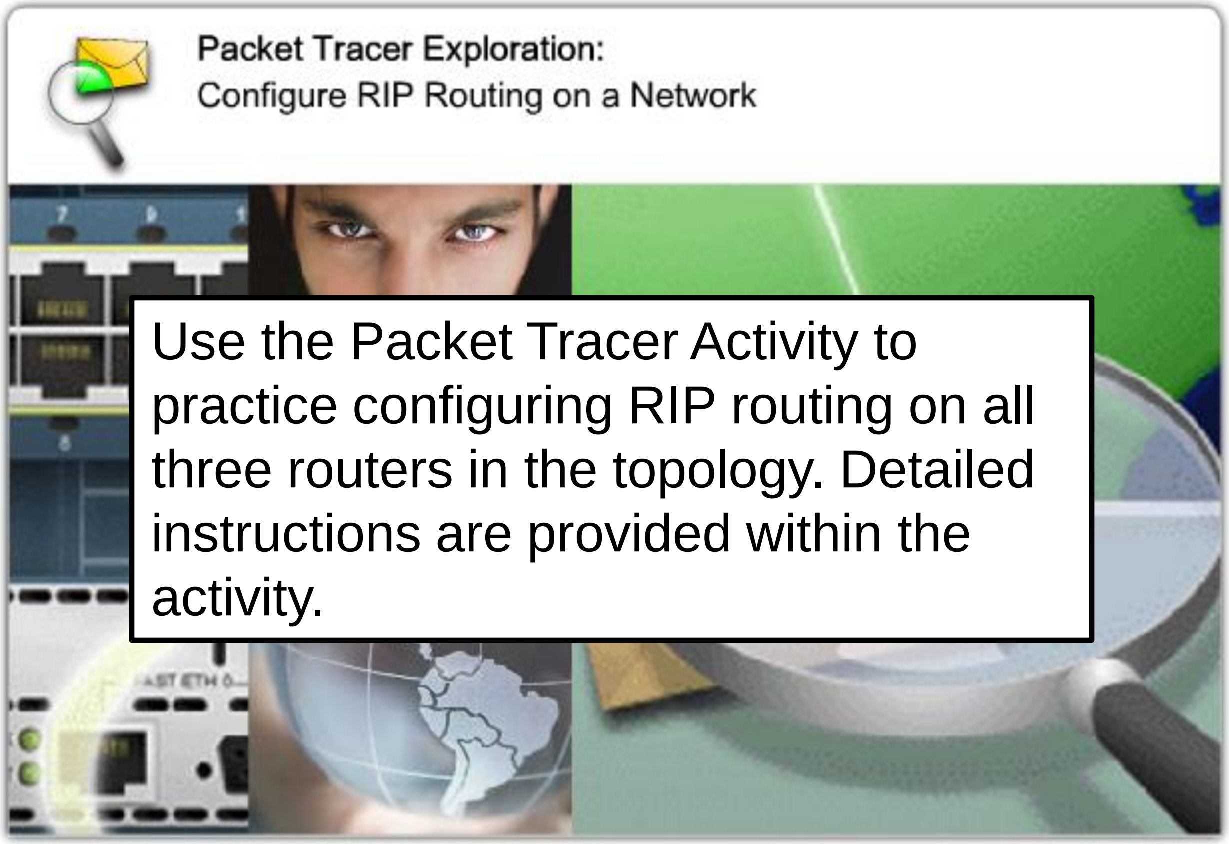
```
R3(config)#router rip
R3(config-router)#network 192.168.4.0
R3(config-router)#network 192.168.5.0
```



Directly Connected Networks

Routers 2 and 3 are not illustrated here but you can understand the concept by referring to the R1 graphic above

5.2.3 Specifying Networks



Use the Packet Tracer Activity to practice configuring RIP routing on all three routers in the topology. Detailed instructions are provided within the activity.

5.3.1 Verifying RIP – Show ip route

Verifying RIP Convergence with `show ip route`

```
R1#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
(**output omitted**)

Gateway of last resort is not set

R    192.168.4.0/24 [120/1] via 192.168.2.2, 00:00:02, Serial0/0/0
R    192.168.5.0/24 [120/2] via 192.168.2.2, 00:00:02, Serial0/0/0
C    192.168.1.0/24 is directly connected, FastEthernet0/0
C    192.168.2.0/24 is directly connected, Serial0/0/0
R    192.168.3.0/24 [120/1] via 192.168.2.2, 00:00:02, Serial0/0/0
```

To verify and troubleshoot routing,
first use **show ip route** and **show ip protocols**.
If you cannot isolate the problem using these two commands, then use **debug ip rip** to see exactly what is happening.

Before you configure any routing - whether static or dynamic - make sure all necessary interfaces are "up" and "up" with the **show ip interface brief** command.

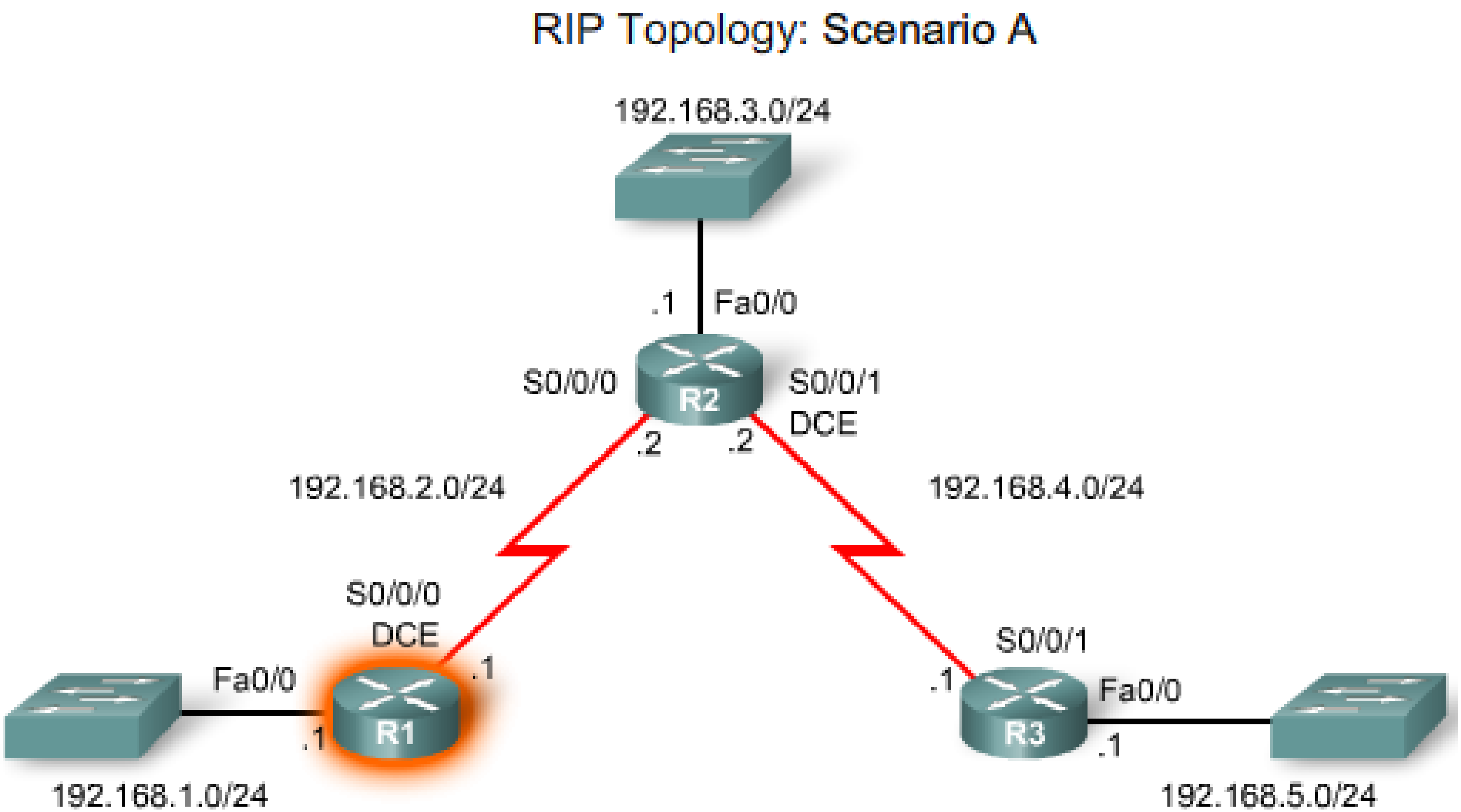
5.3.1 Verifying RIP – Show IP Route

Interpreting a RIP Route in the Routing Table

Output	Description
R	Identifies the source of the route as RIP.
192.168.5.0	Indicates the address of the remote network.
/24	The subnet mask used for this network
[120/2]	The administrative distance (120) and the metric (2 hops)
via 192.168.2.2	Specifies the address of the next-hop router (R2) to send traffic to for the remote network.
00:00:23	Specifies the amount of time since the route was updated (here, 23 seconds). Another update is due in 7 seconds.
Serial0/0/0	Specifies the local interface through which the remote network can be reached.

```
R 192.168.5.0/24 [120/2] via 192.168.2.2, 00:00:23, Serial 0/0/0
```

5.3.1 Verifying RIP – Show IP Route




```
R 192.168.5.0/24 [120/2] via 192.168.2.2, 00:00:23, Serial 0/0/0
```

See if you can understand the routing table entry with the topology above

5.3.2 Verifying RIP Show ip protocols

```
R2#show ip protocols
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 23 se
  Invalid after 180 seconds, hold down 180, flushed a
  Outgoing update filter list for all interfaces is n
  Incoming update filter list for all interfaces is n
  Redistributing: rip
  Default version control: send version 1, receive an
    Interface             Send  Recv  Triggered
    FastEthernet0/0       1        1 2
    Serial0/0/0           1        1 2
    Serial0/0/1           1        1 2
  Automatic network summarization is in effect
  Maximum path: 4
  Routing for Networks:
    192.168.2.0
    192.168.3.0
    192.168.4.0
  Routing Information Sources:
    Gateway         Distance      Last Update
    192.168.2.1          120         00:00:18
    192.168.4.1          120         00:00:22
  Distance: (default is 120)
```

If a network is missing from the routing table, check the routing configuration using **show ip protocols**

Command to show:

- Rip routing is configured
- The correct interfaces send and receive RIP updates
- The router advertises the correct networks
- RIP neighbors are sending updates

- Routing Information Sources are the RIP neighbors this router is currently receiving updates from.
- Includes next-hop IP address, the AD, and when the last update was received.
- Last line shows the AD for this router.

5.3.3 Verifying RIP Using the debut ip rip command

```
R2#debug ip rip
RIP protocol debugging is on
RIP: received v1 update from 192.168.2.1 on Serial0/0/0
      192.168.1.0 in 1 hops
RIP: received v1 update from 192.168.4.1 on Serial0/0/1
      192.168.5.0 in 1 hops
RIP: sending  v1 update to 255.255.255.255 via FastEthernet0
RIP: build update entries
      network 192.168.1.0 metric 2
      network 192.168.2.0 metric 1
      network 192.168.4.0 metric 1
      network 192.168.5.0 metric 2
RIP: sending  v1 update to 255.255.255.255 via Serial0/0/1 (
RIP: build update entries
      network 192.168.1.0 metric 2
      network 192.168.2.0 metric 1
      network 192.168.3.0 metric 1
RIP: sending  v1 update to 255.255.255.255 via Serial0/0/0 (
RIP: build update entries
```

Most RIP configuration errors involve an incorrect network statement configuration, a missing network statement configuration, or the configuration of discontiguous subnets in a classful environment

Debug ip rip command

-Used to display RIP routing updates as they are happening

An effective command used to find issues with RIP updates, this command displays RIP routing updates as they are sent and received. Because updates are periodic, you need to wait for the next round of updates before seeing any output.

R2#undebug all turns debugging off

5.3.4 Passive Interfaces

Unnecessary RIP Updates Impact Network

As you saw in the previous example, R2 is sending updates out FastEthernet0/0 even though no RIP device exists on that LAN. R2 has no way of knowing this and, as a result, sends an update every 30 seconds. Sending out ***unneeded updates*** on a LAN impacts the network in three ways:

1. Bandwidth is wasted transporting unnecessary updates. Because RIP updates are broadcast, switches will forward the updates out all ports.

2. All devices on the LAN must process the update up to the Transport layers, where the receiving device will discard the update.

3. Advertising updates on a broadcast network is a security risk. RIP updates can be intercepted with packet sniffing software. Routing updates can be modified and sent back to the router, corrupting the routing table with false metrics that misdirect traffic.

5.3.4 Passive Interfaces

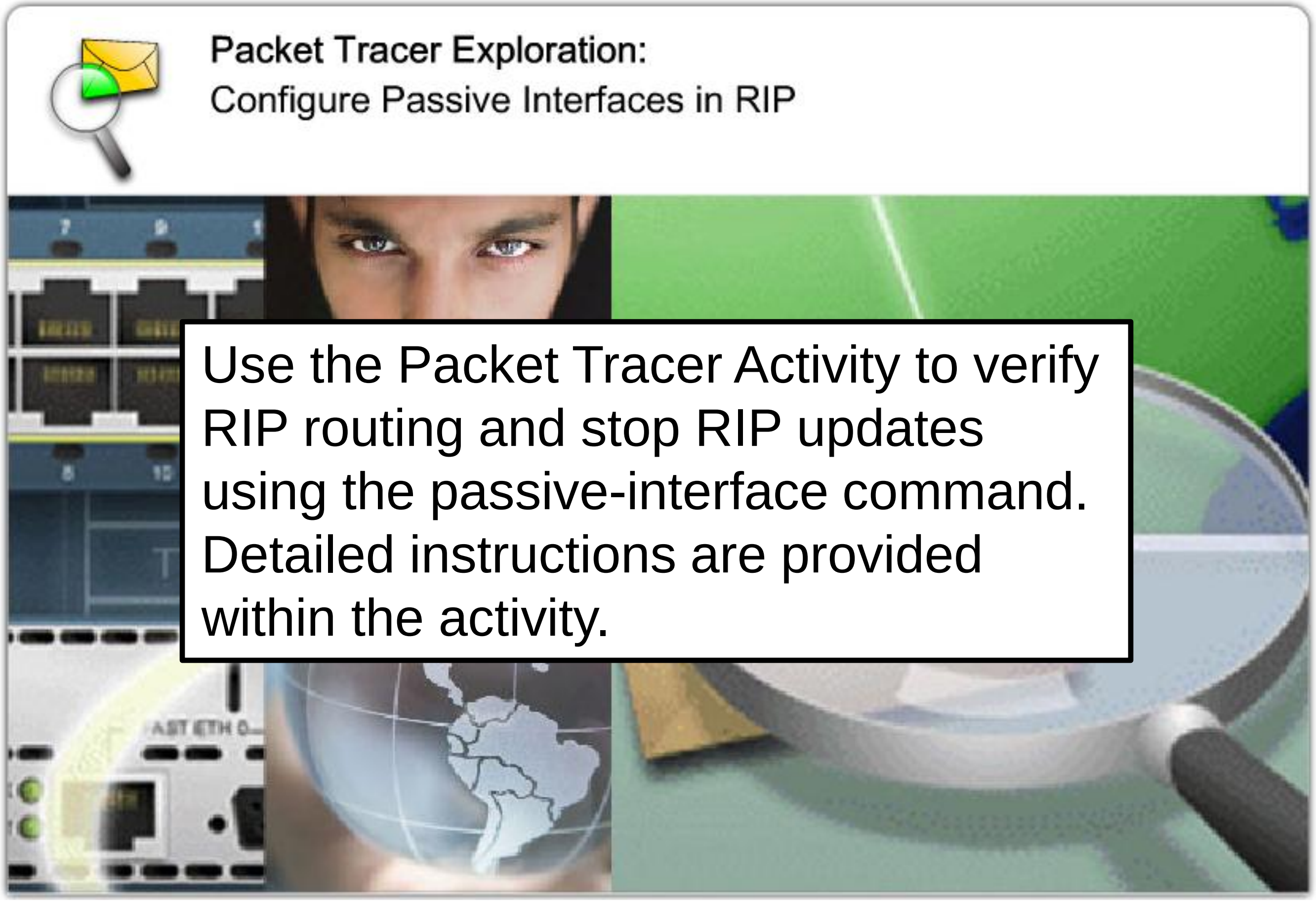
```
R2(config)#router rip
R2(config-router)#passive-interface FastEthernet 0/0
R2(config-router)#end
R2#show ip protocols
Routing Protocol is "rip"
    Sending updates every 30 seconds, next due in 14 seconds
    Invalid after 180 seconds, hold down 180, flushed after 240
    Outgoing update filter list for all interfaces is
    Incoming update filter list for all interfaces is
    Redistributing: rip
    Default version control: send version 1, receive any version
        Interface             Send  Recv  Triggered RIP  Key-chain
        Serial0/0/0           1     1 2
        Serial0/0/1           1     1 2
    Automatic network summarization is in effect
    Routing for Networks:
        192.168.2.0
        192.168.3.0
        192.168.4.0
    Passive Interface(s):
       FastEthernet0/0
    Routing Information Sources:
    Gateway         Distance      Last Update
       192.168.2.1          120       00:00:27
       192.168.4.1          120       00:00:23
Distance: (default is 120)
```

The passive-interface command, prevents the transmission of routing updates through a router interface but still allows that network to be advertised to other routers.

Notice FastEthernet 0/0 is no longer listed under “Default version contol:”

However, R2 is still routing for 192.168.3.0 and now lists FastEthernet under “Passive Interfaces:”

5.3.4 Passive Interfaces



Use the Packet Tracer Activity to verify RIP routing and stop RIP updates using the passive-interface command. Detailed instructions are provided within the activity.

5.4.1 Modified Topology Scenario B

To aid the discussion of automatic summarization, the RIP topology shown in the figure has been modified with the following Three classful networks are used:

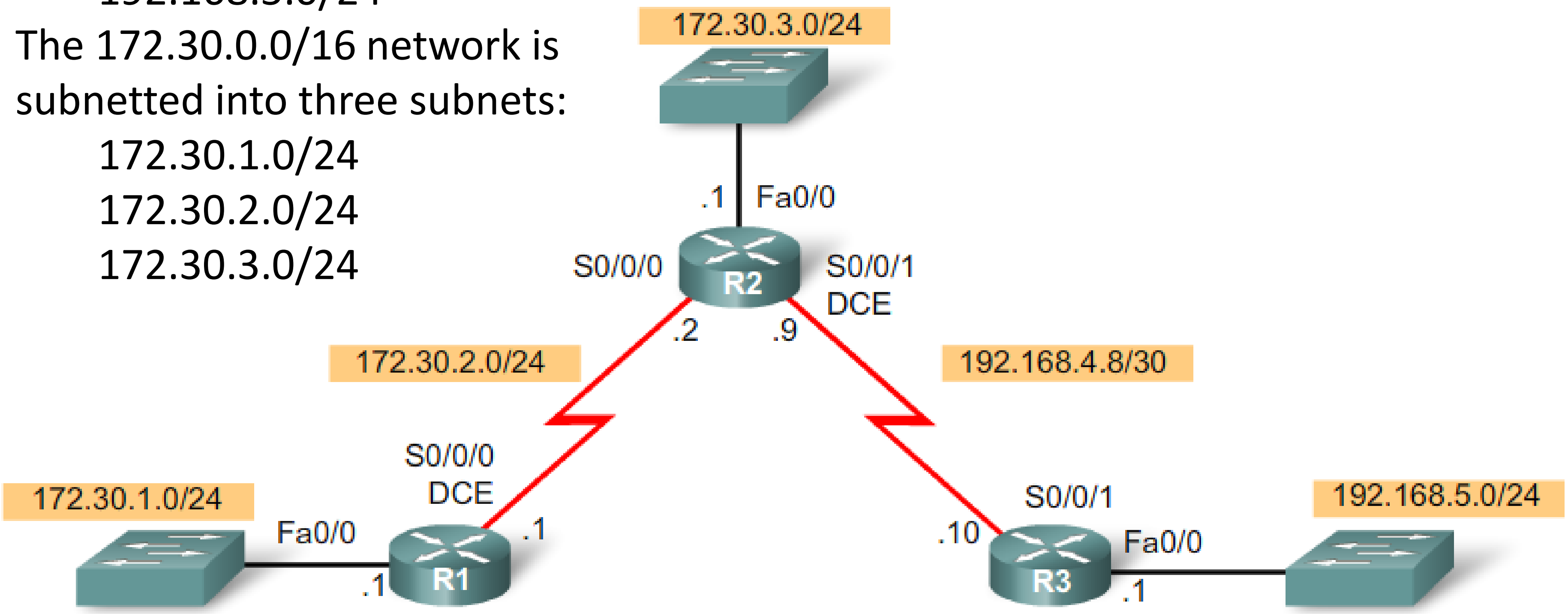
172.30.0.0/16
192.168.4.0/24
192.168.5.0/24

The 172.30.0.0/16 network is subnetted into three subnets:

172.30.1.0/24
172.30.2.0/24
172.30.3.0/24

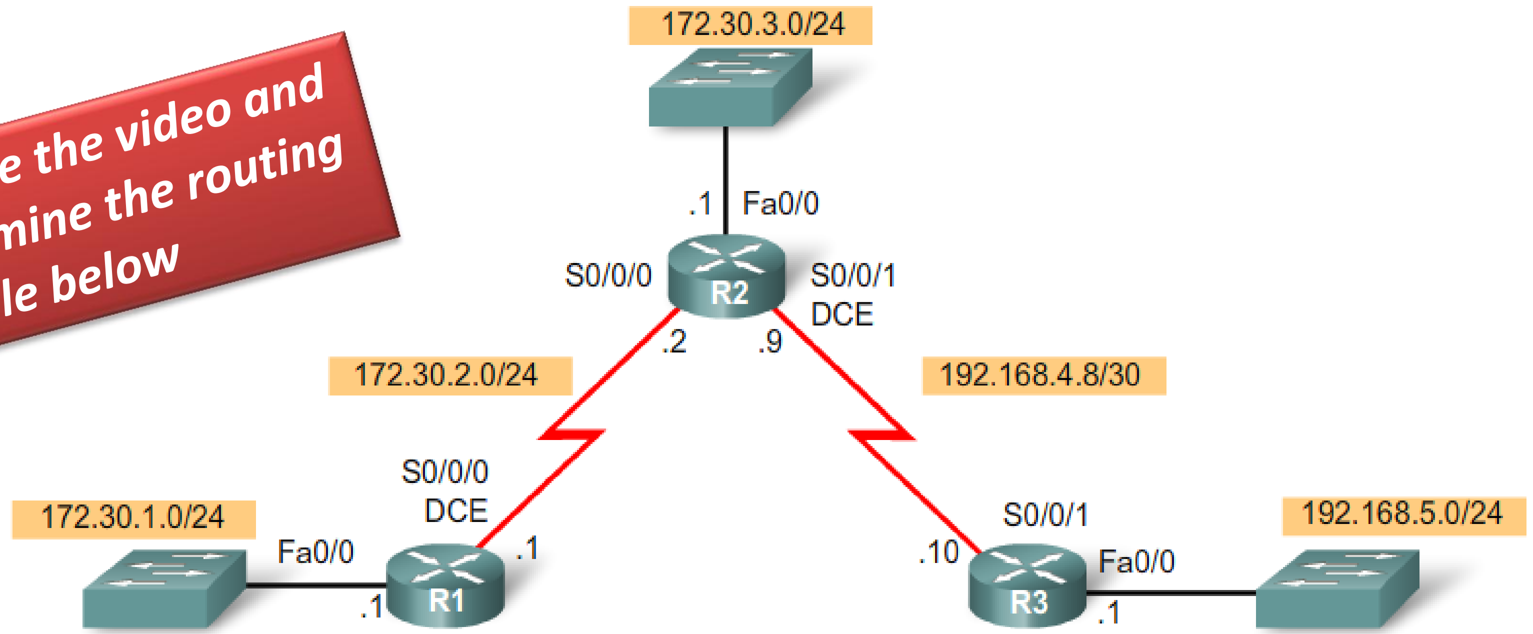
The following devices are part of the 172.30.0.0/16 classful network address:

- All interfaces on R1
- S0/0/0 and Fa0/0 on R2



5.4.1 Modified Topology Scenario B

Pause the video and examine the routing table below



Device	Interface	IP Address	Subnet Mask
R1	Fa0/0	172.30.1.1	255.255.255.0
	S0/0/0	172.30.2.1	255.255.255.0
R2	Fa0/0	172.30.3.1	255.255.255.0
	S0/0/0	172.30.2.2	255.255.255.0
	S0/0/1	192.168.4.9	255.255.255.252
R3	Fa0/0	192.168.5.1	255.255.255.0
	S0/0/1	192.168.4.10	255.255.255.252

5.4.1 Modified Topology Scenario B

```
R1(config)#interface fa0/0
R1(config-if)#ip address 172.30.1.1 255.255.255.0
R1(config-if)#interface S0/0/0
R1(config-if)#ip address 172.30.2.1 255.255.255.0
R1(config-if)#no router rip
R1(config)#router rip
R1(config-router)#network 172.30.1.0
R1(config-router)#network 172.30.2.0
R1(config-router)#passive-interface FastEthernet 0/0
R1(config-router)#end
R1#show run
 (**output omitted**)

!
router rip
 passive-interface FastEthernet0/0
 network 172.30.0.0
!
```

In the output for R1, notice that both subnets were configured with the network command. This configuration is technically incorrect since RIPv1 sends the classful network address in its updates and not the subnet. Therefore, the IOS changed the configuration to reflect the correct, classful configuration, as can be seen with the **show run** output.

5.4.1 Modified Topology Scenario B

```
R3(config)#interface fa0/0
R3(config-if)#ip address 192.168.5.1 255.255.255.0
R3(config-if)#interface S0/0/1
R3(config-if)#ip address 192.168.4.10 255.255.255.252
R3(config-if)#no router rip
R3(config)#router rip
R3(config-router)#network 192.168.4.0
R3(config-router)#network 192.168.5.0
R3(config-router)#passive-interface FastEthernet 0/0
R3(config-router)#end
R3#show run
 (**output omitted**)
!
router rip
 passive-interface FastEthernet0/0
 network 192.168.4.0
 network 192.168.5.0
!
```

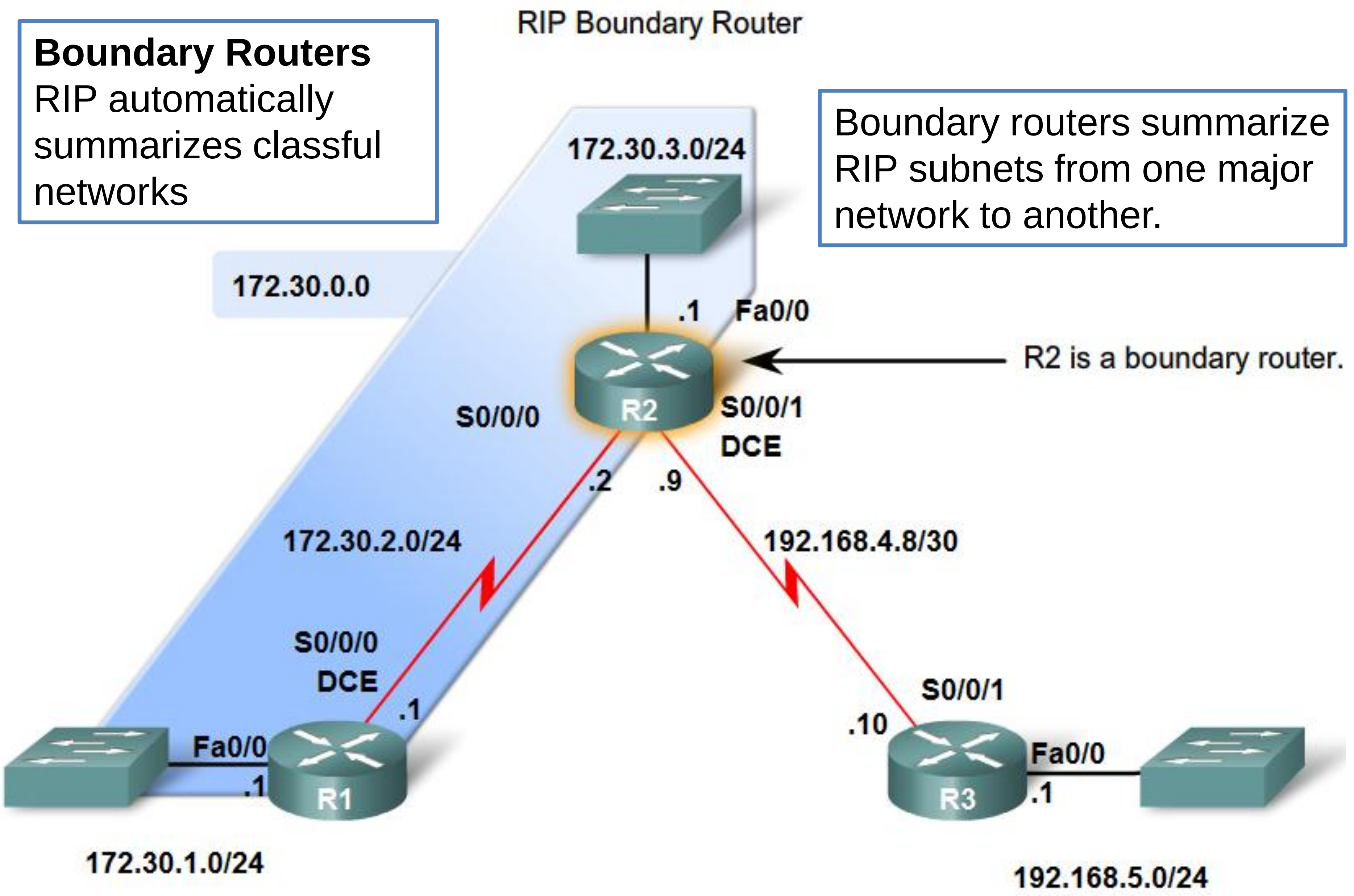
The routing configuration for R3 is correct. The running configuration matches what was entered in router configuration mode.

Note: On assessment and certification exams, entering a subnet address instead of the classful network address in a network command is considered an incorrect answer.

5.4.2 Boundry Routers and Automatic Summarization *

Boundary Routers
RIP automatically summarizes classful networks

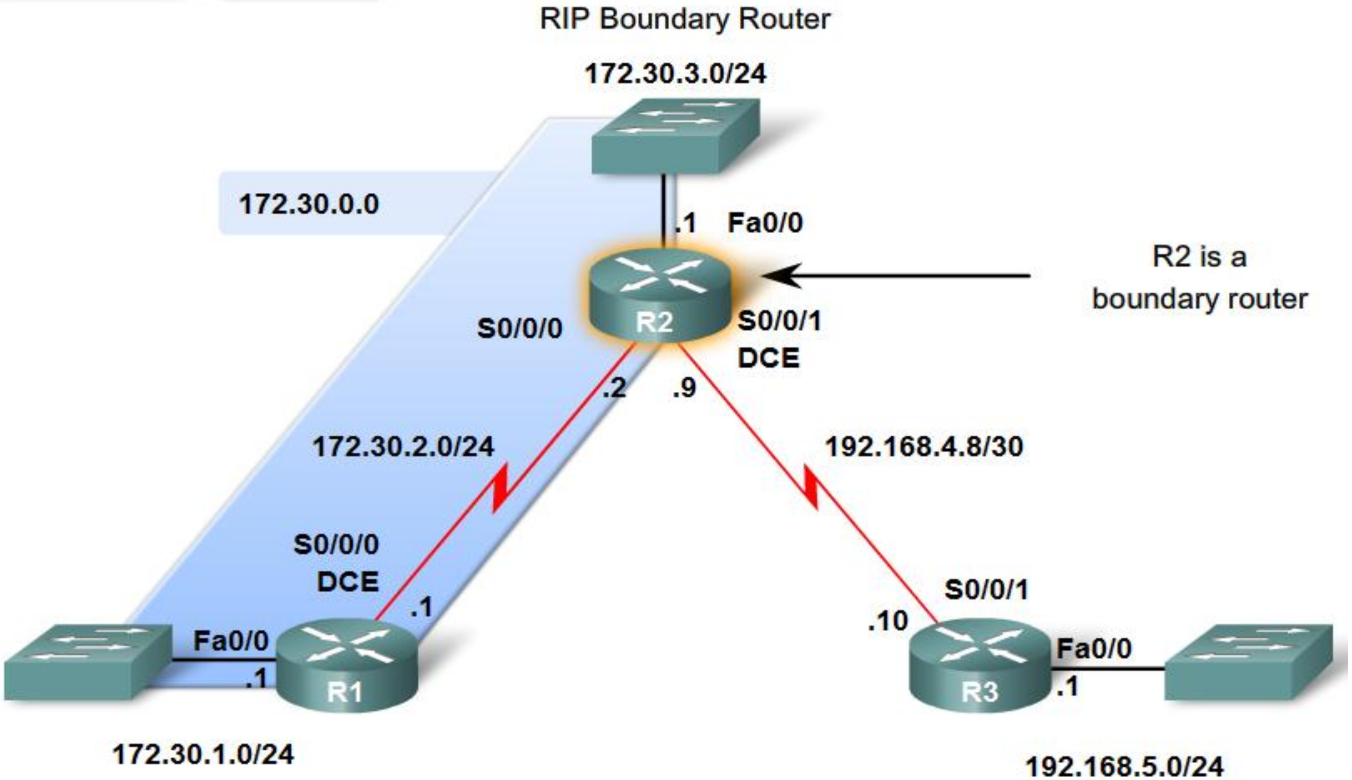
Boundary routers summarize RIP subnets from one major network to another.



5.4.3 Processing RIP Updates

Processing RIP Updates 2 rules govern RIPv1 updates:

1. -If a routing update and the interface it's received on belong to the **same network** the subnet mask of **the interface** is applied to the network in the routing update
2. -If a routing update and the interface it's received on belong to a **different network t**he classful subnet mask of the **network** is applied to the network in the routing update.



Routers running RIPv1 are limited to using the same subnet mask for all subnets with the same classful network.

5.4.3 Processing RIP Updates

How does R2 know that this subnet has a /24 (255.255.255.0) subnet mask?

- R2 received this information on an interface that belongs to the same classful network (172.30.0.0) as that of the incoming 172.30.1.0 update.
- The IP address for which R2 received the "172.30.1.0 in 1 hops" message was on Serial 0/0/0 with an IP address of 172.30.2.2 and a subnet mask of 255.255.255.0 (/24).
- R2 uses its own subnet mask on this interface and applies it to this and all other 172.30.0.0 subnets that it receives on this interface - in this case, 172.30.1.0.
- The 172.30.1.0 /24 subnet was added to the routing table.

```
R2#debug ip rip
RIP protocol debugging is on
RIP: received v1 update from 172.30.2.1 on Serial0/0/0
      172.30.1.0 in 1 hops
```

```
     172.30.0.0/24 is subnetted, 3 subnets
R       172.30.1.0 [120/1] via 172.30.2.1, 00:00:18, Serial0/0/0
C       172.30.2.0 is directly connected, Serial0/0/0
C       172.30.3.0 is directly connected, FastEthernet0/0
     192.168.4.0/30 is subnetted, 1 subnets
C       192.168.4.8 is directly connected, Serial0/0/1
R    192.168.5.0/24 [120/1] via 192.168.4.10, 00:00:16, Serial0/0/1
```

5.4.4 Sending RIP Updates

Automatic Summarization

Sending RIP Update

- RIP uses automatic summarization to reduce the size of a routing table.

```
R2#debug ip rip
RIP protocol debugging is on
RIP: sending  v1 update to 255.255.255.255 via Serial0/0/0 (172.30.2.2)
RIP: build update entries
      network 172.30.3.0 metric 1
      network 192.168.4.0 metric 1
      network 192.168.5.0 metric 2
RIP: sending  v1 update to 255.255.255.255 via Serial0/0/1 (192.168.4.9)
RIP: build update entries
      network 172.30.0.0 metric 1
R2#undebug all
All possible debugging has been turned off
R2#
```

Routes sent to R1.

5.4.5 Advantages and Disadvantages of Automatic Summarization

Advantages of automatic summarization:

- -The size of routing updates is reduced
- -Single routes are used to represent multiple routes which results in faster lookup in the routing table.

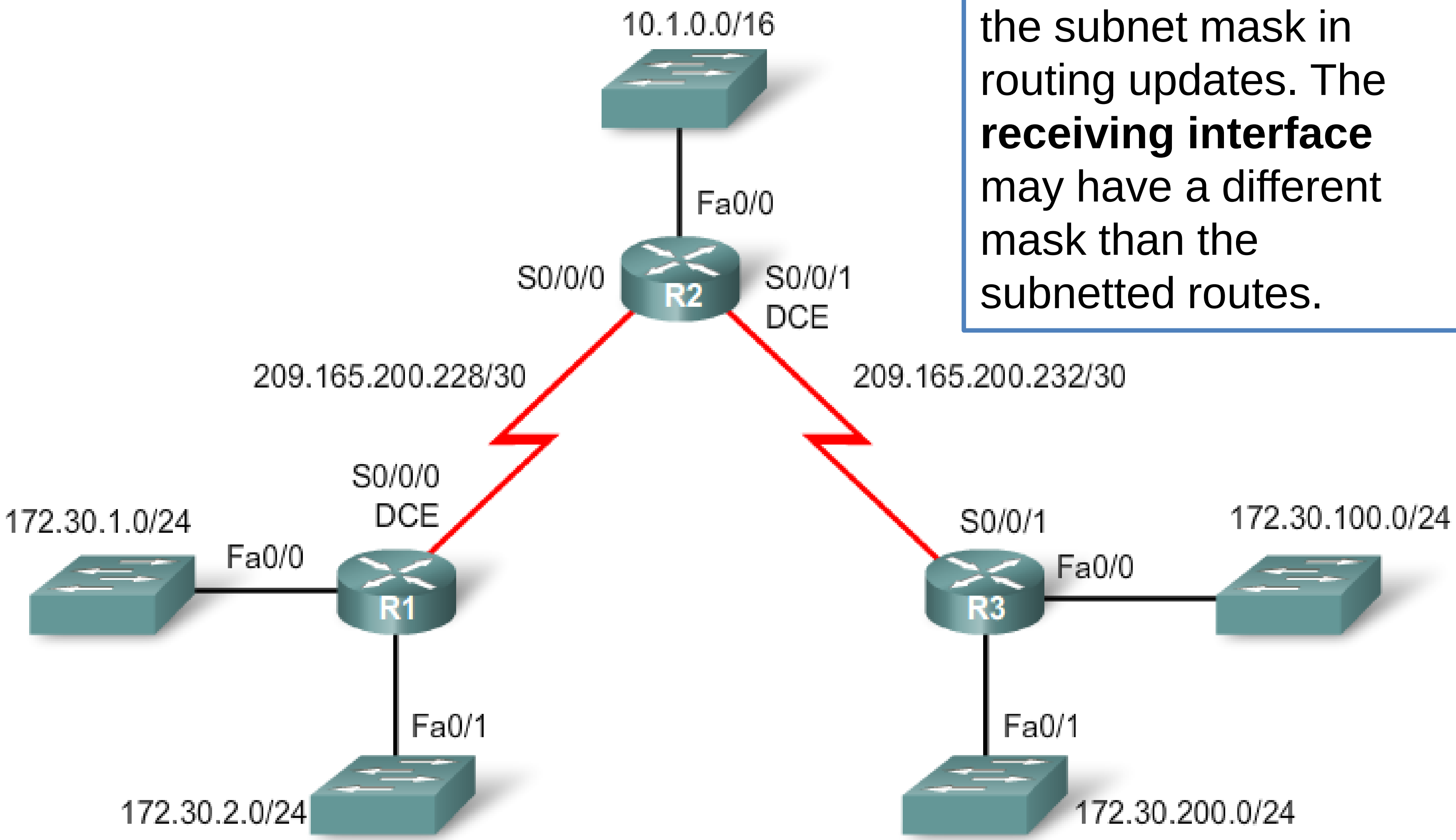
```
R3#show ip route
Codes: C - connected, S - static, I -IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSFP inter area
       N1 - OSPF NSSA externasl type 1, N2 - OSPF NSSA external type2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, II - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

R    172.30.0.0/16 [120/1] via 192.168.4.9, 00:00:15, Serial0/0/1
     192.168.4.0/30 is subnetted, 1 subnets
C       192.168.4.8 is directly connected, Serial0/0/1
C    192.168.5.0/24 is directly connected, FastEthernet0/0
```

R3 receives a single summarized route.

5.4.5 Advantages and Disadvantages of Automatic Summarization

Disadvantage of Automatic Summarization:

-Does not support discontiguous networks



Classful routing protocols do not include the subnet mask in routing updates. The **receiving interface** may have a different mask than the subnetted routes.

5.4.5 Advantages and Disadvantages of Automatic Summarization

Discontiguous Topologies do not converge with RIPv1
A router will only advertise major network addresses out interfaces that do not belong to the advertised route.

```
R1(config)#router rip
R1(config-router)#network 172.30.0.0
R1(config-router)#network 209.165.200.0
```

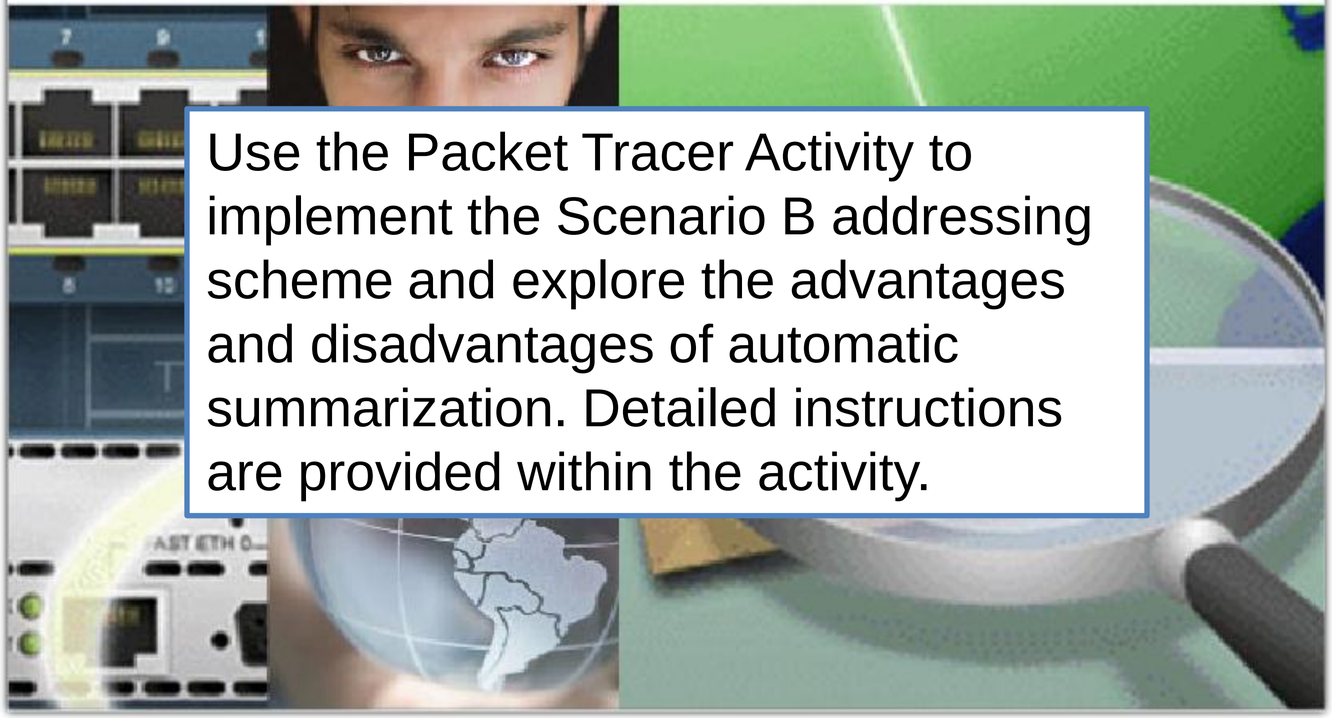
```
R2(config)#router rip
R2(config-router)#network 10.0.0.0
R2(config-router)#network 209.165.200.0
```

```
R3(config)#router rip
R3(config-router)#network 172.30.0.0
R3(config-router)#network 209.165.200.0
```

R1 will not advertise 172.30.1.0 or 172.30.2.0 to R2 across the 209.165.200.0 network. R3 will not advertise 172.30.100.0 or 172.30.200.0 to R2 across the 209.165.200.0 network. Both routers R1 and R3, however, will advertise the 172.30.0.0 major network address.

5.4.5 Advantages and Disadvantages of Automatic Summarization

Packet Tracer Exploration:
Automatic Route Summarization in RIP



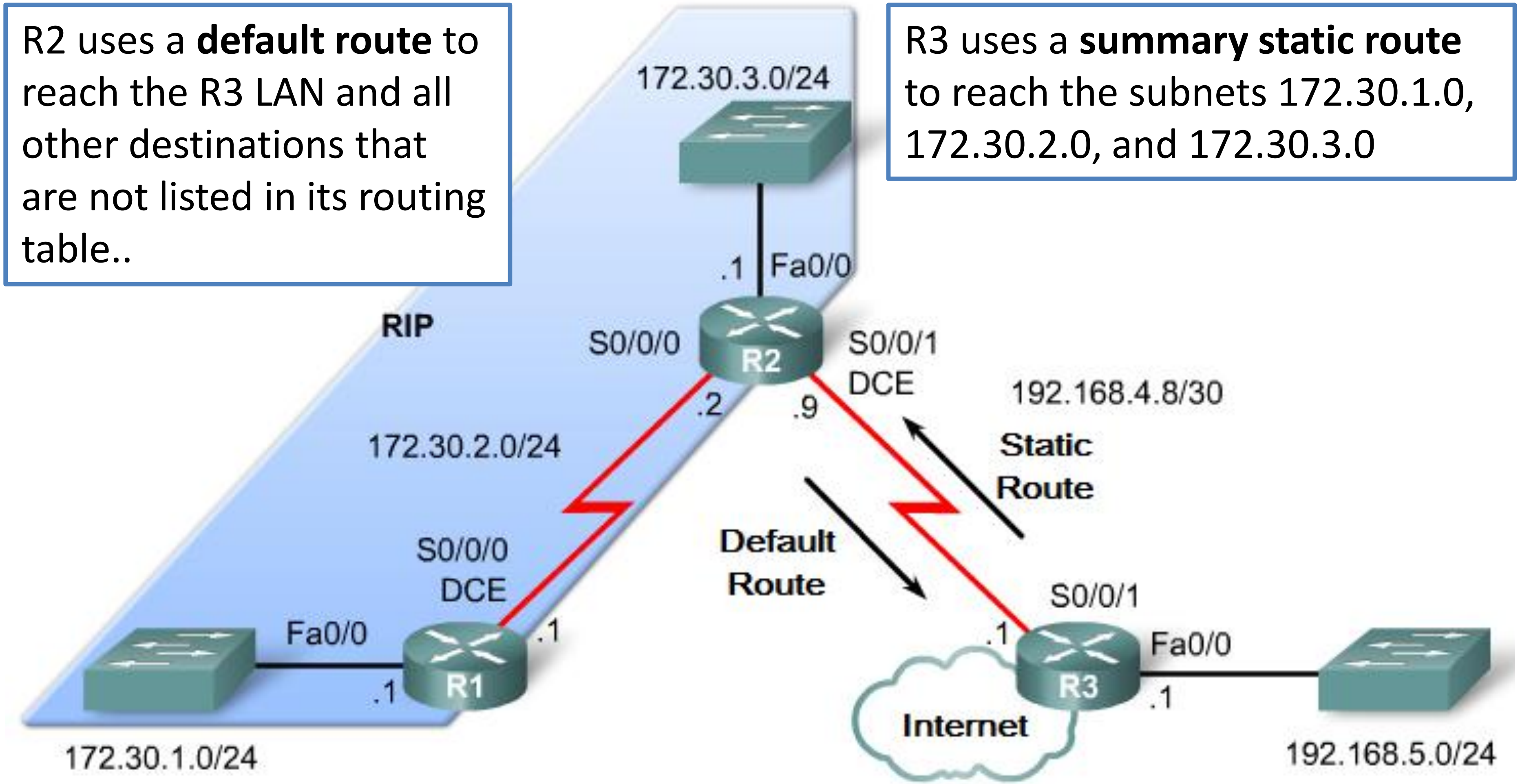
Use the Packet Tracer Activity to implement the Scenario B addressing scheme and explore the advantages and disadvantages of automatic summarization. Detailed instructions are provided within the activity.

5.5.1 Modified Topology Scenerio C *

In scenario C, R3 is the service provider with access to the Internet, as signified by the cloud. R3 and R2 do not exchange RIP updates.

R2 uses a **default route** to reach the R3 LAN and all other destinations that are not listed in its routing table..

R3 uses a **summary static route** to reach the subnets 172.30.1.0, 172.30.2.0, and 172.30.3.0



5.5.1 Modified Topology Scenerio C

Default routes
Packets that are not defined specifically in a routing table will go to the specified interface for the default route
Example: Customer routers use default routes to connect to an ISP router.
Command used to configure a default route is
ip route 0.0.0.0 0.0.0.0 s0/0/1

- Disable RIP routing on R2 for the 192.168.4.0 network only.
- Configure R2 with a default route pointing to R3.

```
R2(config)#router rip
R2(config-router)#no network 192.168.4.0
R2(config-router)#exit
R2(config)#ip route 0.0.0.0 0.0.0.0 serial 0/0/1
```

- Completely disable RIP routing on R3.
- Configure R3 with a static route pointing R2.

```
R3(config)#no router rip
R3(config)#ip route 172.30.0.0 255.255.252.0 serial 0/0/1
```

5.5.2 Propagating the Default Rout in RIPv1 *

Propagating the Default Route in RIPv1

Default-information originate command

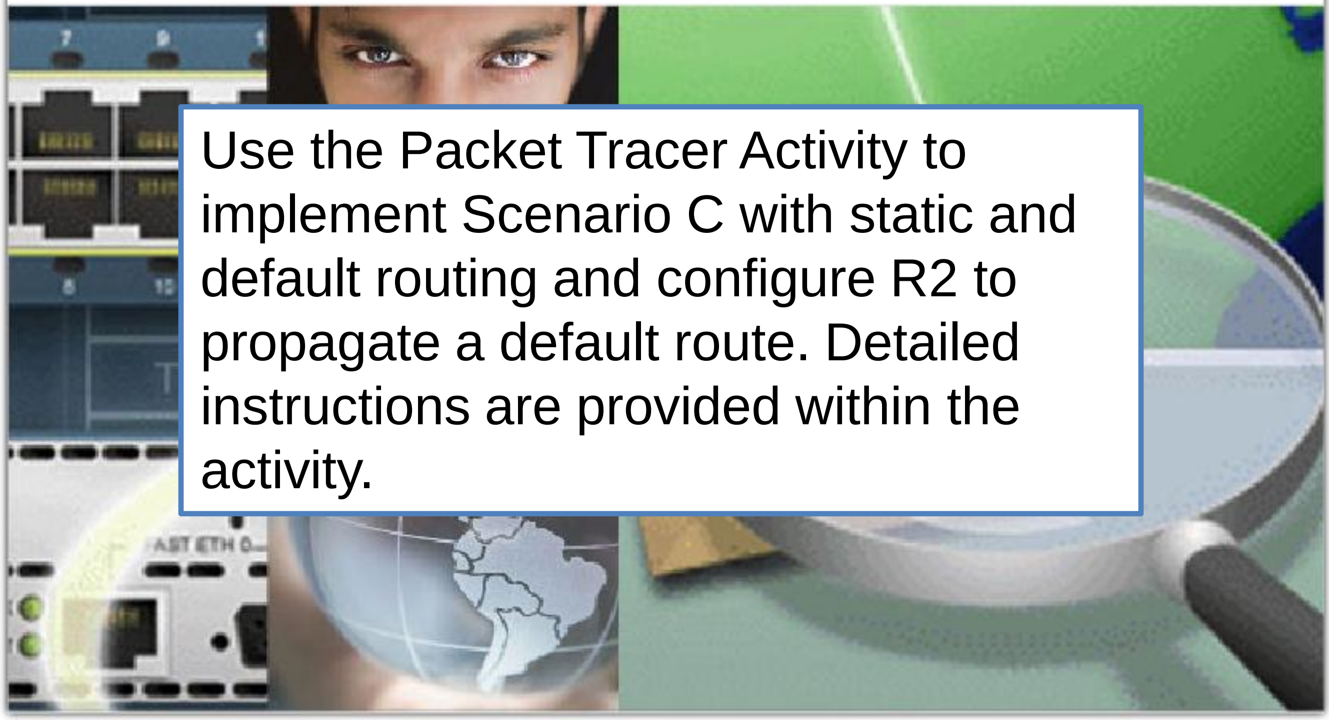
-This command is used to specify that the router is to originate default information, by propagating the static default route in RIP update.

```
R2(config)#router rip
R2(config-router)#default-information originate
R2(config-router)#end
R2#debug ip rip
RIP protocol debugging is on
RIP: sending v1 update to 255.255.255.255 via Serial0/0/0 (172.30.2.2)
RIP: build update entries
          subnet 0.0.0.0 metric 1
          subnet 172.30.3.0 metric 2
R2#undebug all
All possible debugging has been turned off
```

R2 is now sending a "quad-zero" route to R1.

5.5.2 Propagating the Default Rout in RIPv1

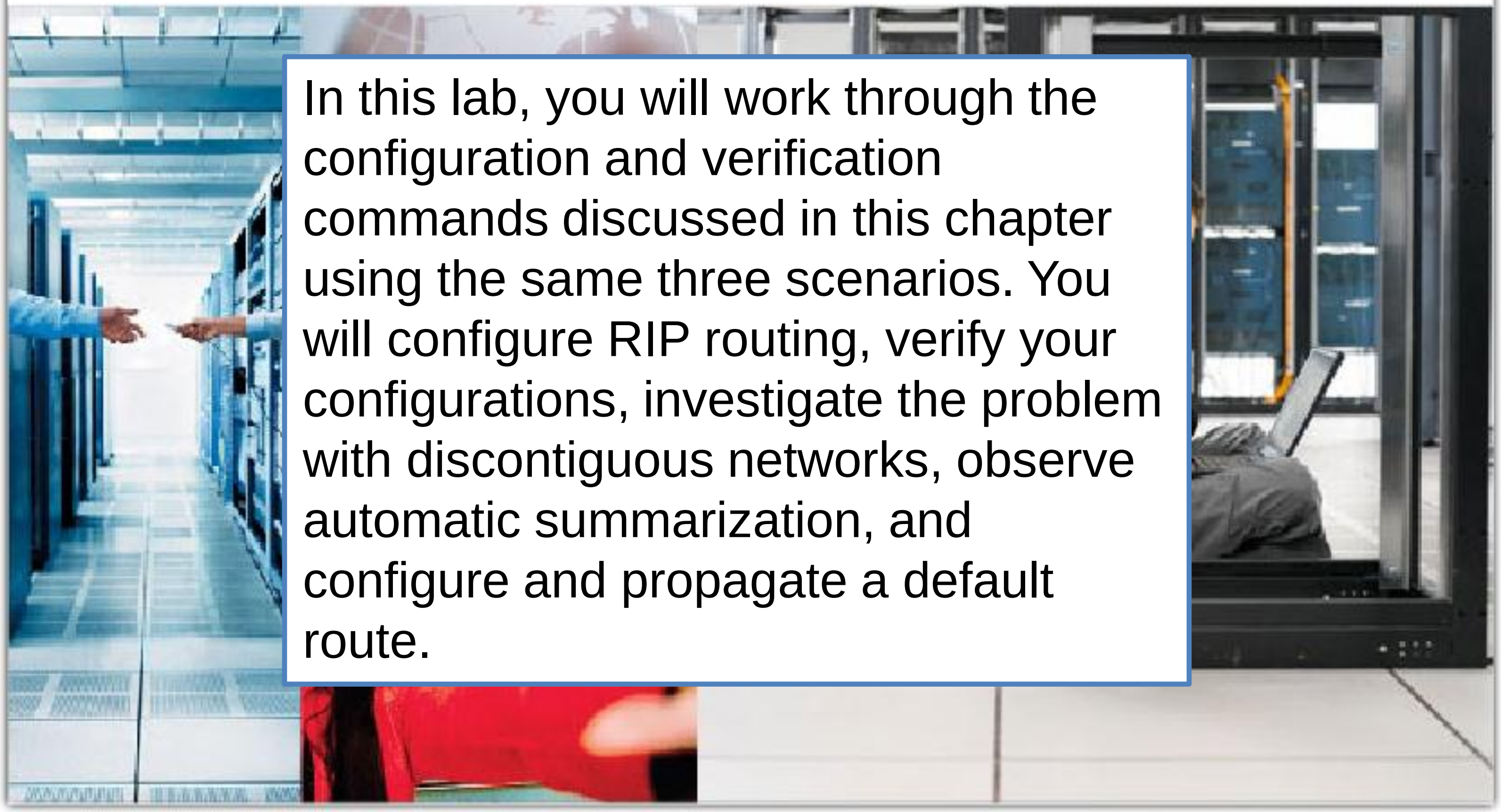
Packet Tracer Exploration:
Propagating the Default Route in RIP



Use the Packet Tracer Activity to implement Scenario C with static and default routing and configure R2 to propagate a default route. Detailed instructions are provided within the activity.

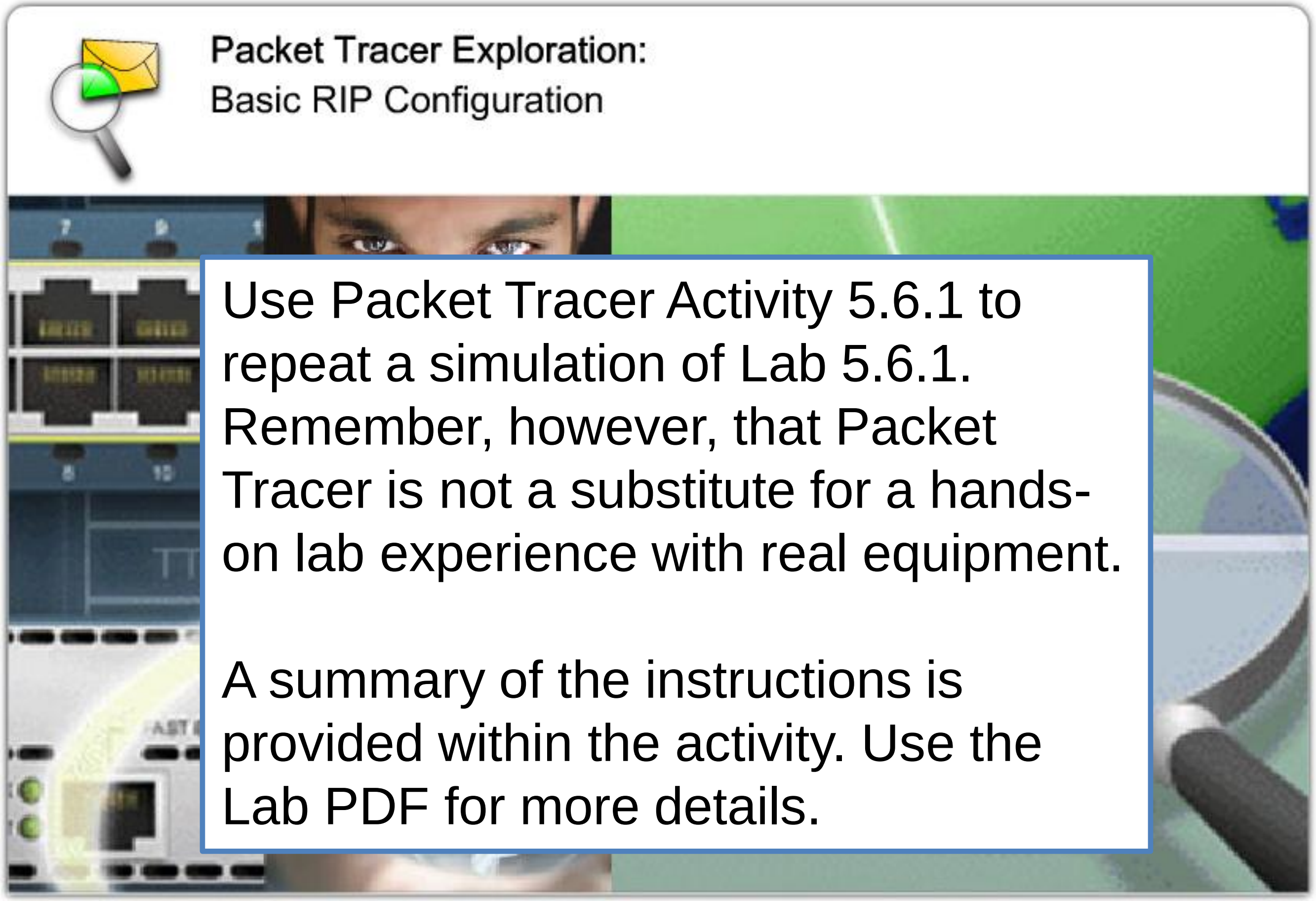
Hands-on Lab:

Basic RIP Configuration



In this lab, you will work through the configuration and verification commands discussed in this chapter using the same three scenarios. You will configure RIP routing, verify your configurations, investigate the problem with discontiguous networks, observe automatic summarization, and configure and propagate a default route.

5.6.1 Basic RIP Configuration



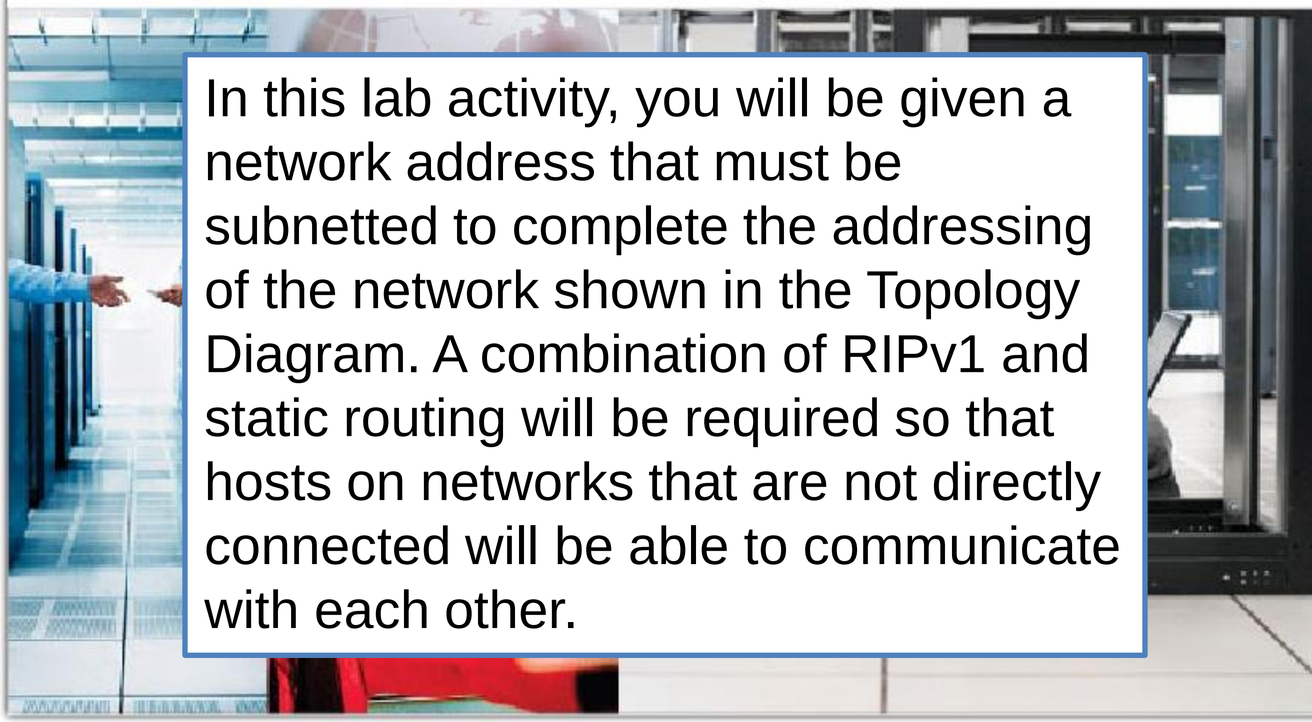
Use Packet Tracer Activity 5.6.1 to repeat a simulation of Lab 5.6.1. Remember, however, that Packet Tracer is not a substitute for a hands-on lab experience with real equipment.

A summary of the instructions is provided within the activity. Use the Lab PDF for more details.

5.6.2 Challenge RIP Configuration

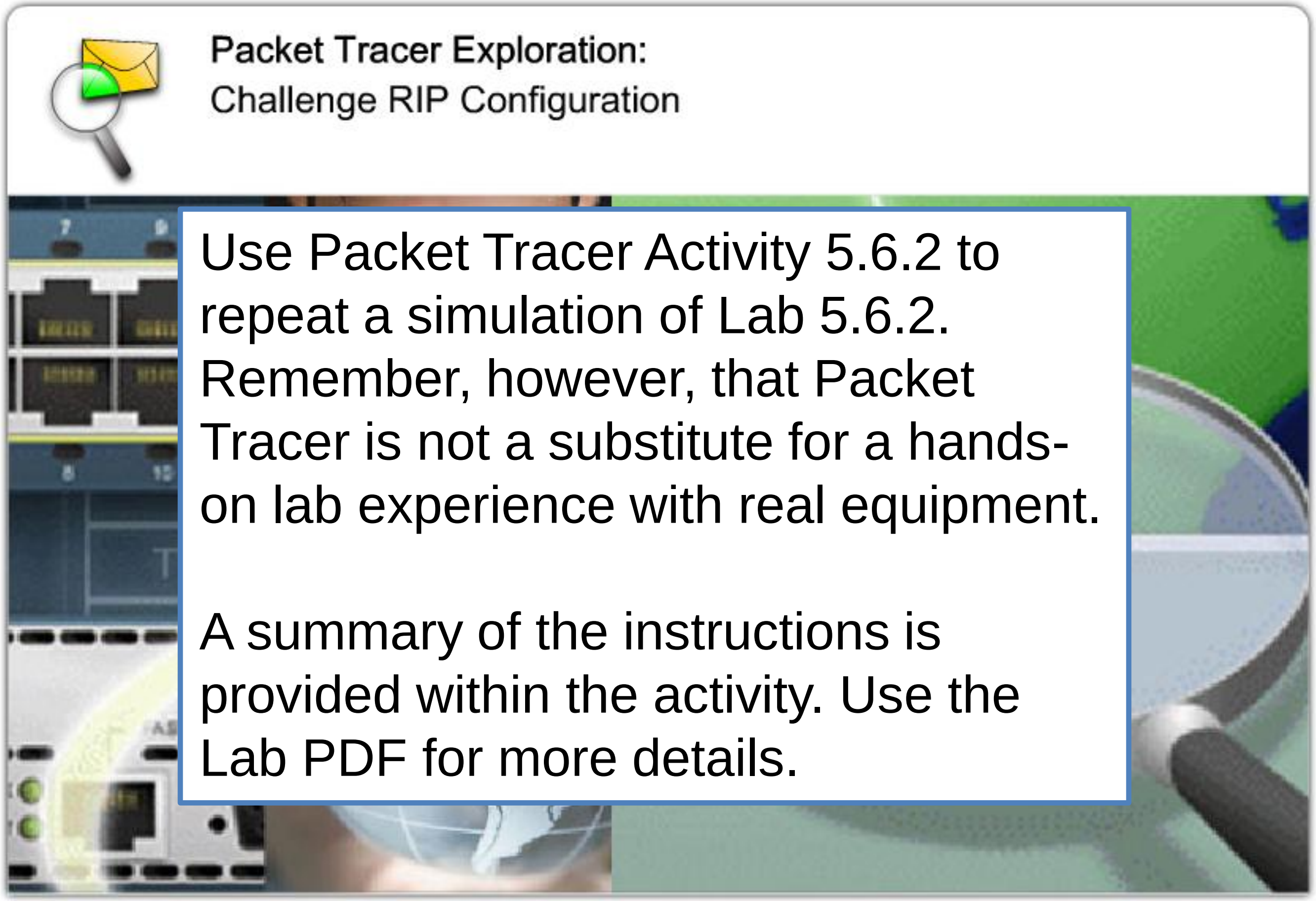
Hands-on Lab:

Challenge RIP Configuration



In this lab activity, you will be given a network address that must be subnetted to complete the addressing of the network shown in the Topology Diagram. A combination of RIPv1 and static routing will be required so that hosts on networks that are not directly connected will be able to communicate with each other.

5.6.2 Challenge RIP Configuration

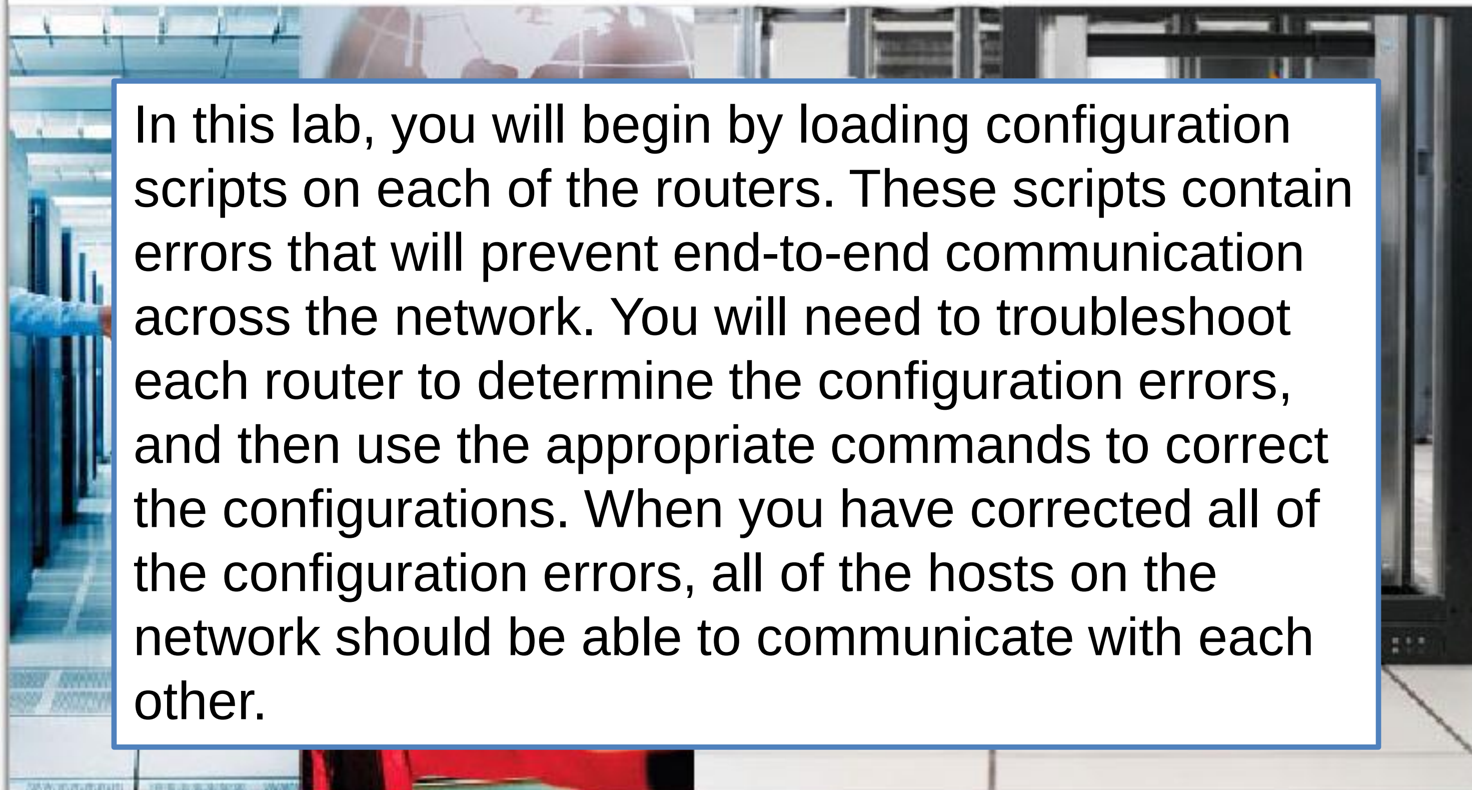


Use Packet Tracer Activity 5.6.2 to repeat a simulation of Lab 5.6.2. Remember, however, that Packet Tracer is not a substitute for a hands-on lab experience with real equipment.

A summary of the instructions is provided within the activity. Use the Lab PDF for more details.

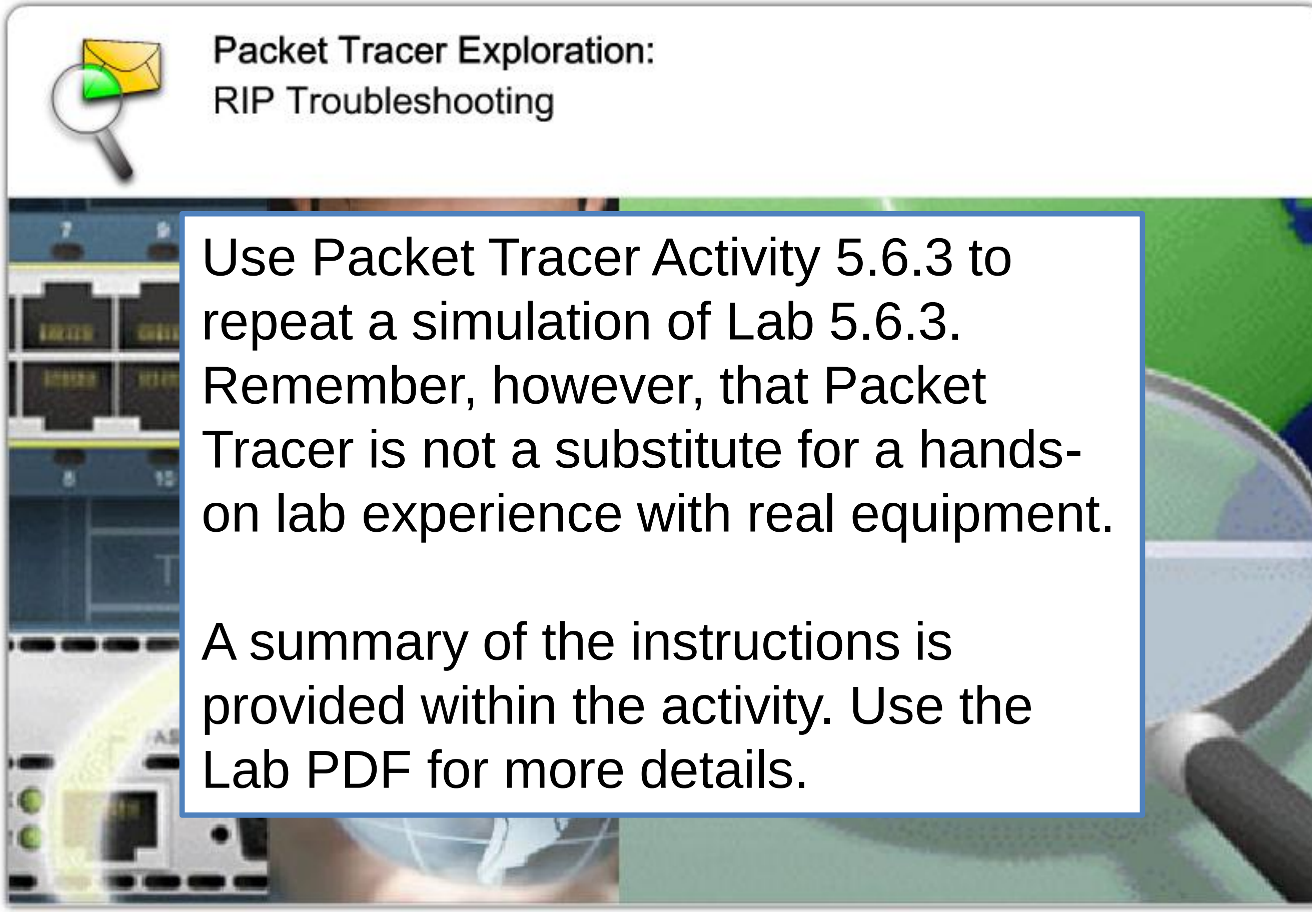
5.6.3 RIP Troubleshooting

Hands-on Lab:
RIP Troubleshooting



In this lab, you will begin by loading configuration scripts on each of the routers. These scripts contain errors that will prevent end-to-end communication across the network. You will need to troubleshoot each router to determine the configuration errors, and then use the appropriate commands to correct the configurations. When you have corrected all of the configuration errors, all of the hosts on the network should be able to communicate with each other.

5.6.3 RIP Troubleshooting



Use Packet Tracer Activity 5.6.3 to repeat a simulation of Lab 5.6.3. Remember, however, that Packet Tracer is not a substitute for a hands-on lab experience with real equipment.

A summary of the instructions is provided within the activity. Use the Lab PDF for more details.

5.7.1 Summary and Review

Packet Tracer Exploration:

Ch5 - Packet Tracer Skills Integration Challenge

The Packet Tracer Skills Integration Challenge Activity for this chapter integrates all the knowledge and skills you acquired in the first two chapters of this course and adds knowledge and skills related to RIPv1.

In this activity, you build a network from the ground up. Starting with an addressing space and network requirements, you must implement a network design that satisfies the specifications. Next, you implement an effective RIPv1 routing configuration with integrated default routing. Detailed instructions are provided within the activity.

Packet Tracer Skills Integration Instructions (PDF)

Summary

- RIP characteristics include:
  - Classful, distance vector routing protocol
  - Metric is Hop Count
  - Does not support VLSM or discontiguous subnets
  - Updates every 30 seconds
- Rip messages are encapsulated in a UDP segment with source and destination ports of 520

Summary: Commands used by RIP

Command	Command's purpose
Rtr(config)#router rip	Enables RIP routing process
Rtr(config-router)#network	Associates a network with a RIP routing process
Rtr#debug ip rip	used to view real time RIP routing updates
Rtr(config-router)#passive-interface fa0/0	Prevent RIP updates from going out an interface
Rtr(config-router)#default-information originate	Used by RIP to propagate default routes
Rtr#show ip protocols	Used to display timers used by RIP

5.7.1 Summary and Review

	Interior Gateway Protocols				Exterior Gateway Protocols
	Distance Vector Routing Protocols		Link State Routing Protocols		Path Vector
Classful	RIP	IGRP			EGP
Classless	RIPv2	EIGRP	OSPFv2	IS-IS	BGPv4
IPv6	RIPng	EIGRP for IPv6	OSPFv3	IS-IS for IPv6	BGPv4 for IPv6

In this chapter, you have learned to:

- Describe the functions, characteristics, and operation of the RIPv1 protocol.
- Configure a device for using RIPv1.
- Verify proper RIPv1 operation.
- Describe how RIPv1 performs automatic summarization.
- Configure, verify, and troubleshoot default routes propagated in a routed network implementing RIPv1.
- Use recommended techniques to solve problems related to RIPv1.

The curriculum has a very good summary of the concepts learned in Chapter 5
You might consider printing the summary for future reference

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